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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/773,716      | 02/05/2004  | Seng Guan Chow       | 27-011              | 8312             |

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EXAMINER

PAREKH, NITIN

|          |              |
|----------|--------------|
| ART UNIT | PAPER NUMBER |
|----------|--------------|

2811

DATE MAILED: 04/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                               |                             |  |
|------------------------------|-------------------------------|-----------------------------|--|
| <b>Office Action Summary</b> | Application No.<br>10/773,716 | Applicant(s)<br>CHOW ET AL. |  |
|                              | Examiner<br>Nitin Parekh      | Art Unit<br>2811            |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 17 February 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) 13-24 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6-10 and 12 is/are rejected.
- 7) ☒ Claim(s) 5 and 11 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>02-05-04</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Election/Restriction***

1. Applicant's election with traverse of Group II, claims 1-12 in Paper No. 3 is acknowledged. The traversal is on the ground(s) that in the requirement for an election, Groups I and II differ only in a semiconductor device and method for making the same. Requiring an election based on the above-noted differences would appear to be unwarrant since the fields of search appear to be almost identical. This is not found persuasive because referring to the restriction requirement set forth in the Office Action paper no.2, it clearly shows that the alternative method proposed by the examiner would be distinct from the process claimed. Additionally, the search is not coextensive as evidenced by the different fields of search for the process and product as cited in the previous restriction requirement. Furthermore, Applicant has not provided a convincing argument that the materially different processes would not be suitable in producing the claimed device.

The requirement is still deemed proper and is therefore made FINAL.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 2, 4 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakazawa et al. (US Pat. 5648682).

Regarding claims 1, 2 and 6, Nakazawa et al. disclose an integrated circuit package (ICP) and a method of forming such package, the method comprising:

- providing a leadframe (2 in Fig. 4 and 8) having parallel lead fingers (see 22 in Fig. 4, 7 and 8; Col. 4, lines 17-22), the inner leads having tips/inner end of a straight configurations (see Fig. 7)
- forming a recess having a bottom surface/partially blind groove (24 in Fig. 4 and 8; Col. 4, line 27) proximate the end/tip in the lead finger (Fig. 4), and
- placing a chip/electronic device/IC die having a conductive material/conductive ball/bonding agent (see 1/7 in Fig. 4 and 8; Col. 5, line 53) such as gold in the recess/groove to bond the chip/IC die to the lead finger, the chip/electronic device/IC die extending between the lead fingers (see 1 in Fig. 7 and 8)

(Fig. 4, 7 and 8; Col. 4 and 5)

Nakazawa et al. fail to teach placing the conductive bonding agent in the groove and placing the electronic device chip to be held by the conductive bonding agent.

Nakazawa et al. further teach another embodiment (Fig. 13) wherein a conductive agent such as solder (see 9 in Fig. 13) is placed on outer ends of the leads to form a solder bump array providing an external connection (Col. 6, lines 40-60).

It would have been obvious to a person of ordinary skill in the art at the time invention was made to incorporate the step of placing the conductive bonding agent on the leads within the recess/groove and placing the electronic device chip to be held by the conductive bonding agent as taught by the embodiment of Fig. 13 in Nakazawa et al. so that material handling/processing can be simplified and the cycle time can be reduced in Nakazawa et al's method.

Regarding claim 4, Nakazawa et al. teach the entire method as applied to claim 1 above, wherein Nakazawa et al. teach the recess/groove including a reservoir/space for the conductive bonding agent to be located within/adjacent to the groove (see 24 in Fig. 8).

3. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakazawa et al. (US Pat. 5648682) in view of Tsubosaki et al. (US Pat. 5714405).

Regarding claim 3, Nakazawa et al. teach substantially the entire method as applied to claim 1 above, except forming the lead finger into an external lead around at least a portion of the ICP.

Tsubosaki et al. teach an ICP (Fig. 8-10) wherein leads/lead fingers are formed into external leads (see 3 in Fig. 8-10) around the ICP to improve the lead adhesion

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(Col. 8) and further teach placing additional device on the external lead exterior to the ICP (see 20 in Fig. 15; Col. 9).

It would have been obvious to a person of ordinary skill in the art at the time invention was made to form the lead finger into an external lead around at least a portion of the ICP or bonding the IC die by at least one of wire or ball to the lead finger; and forming at least one of a solder bump or a ball grid array ball on the lead finger as taught by Tsubosaki et al. so that lead adhesion can be improved and the external connection area can be increased in Nakazawa et al's method.

4. Claims 7, 8, 10 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakazawa et al. (US Pat. 5648682) in view of admitted prior art (APA).

Regarding claims 7, 8 and 12, Nakazawa et al. teach substantially the entire method as applied to claim 1 above, except placing a passive device in the blind groove.

The APA teaches the leadframe ICP comprising a variety of small passive components (specification pp.1).

It would have been obvious to a person of ordinary skill in the art at the time invention was made to place the passive device in the blind groove as taught by the APA so that the desired functionality and application requirements can be achieved in Nakazawa et al's method.

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Regarding claim 10, Nakazawa et al. and APA teach substantially the entire method as applied to claims 1, 4 and 7 above.

5. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakazawa et al. (US Pat. 5648682) and APA as applied to claim 7 above, and further in view of Tsubosaki et al. (US Pat. 5714405).

Regarding claim 9, Nakazawa et al., APA and Tsubosaki et al. teach substantially the entire method as applied to claims 1, 3 and 7 above.

***Allowable Subject Matter***

6. Claims 5 and 11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Reasons for Allowance***

7. The following is an examiner's statement of reasons for allowance:

The references of record do not teach either singularly or in combination at least the steps of "providing a leadframe paddle; forming a groove in the leadframe paddle; placing a conductive bonding agent in the groove; and placing the electronic device in the groove to be held by the conductive bonding agent" in a method of forming a

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leadframe package by providing a leadframe including lead fingers, forming a groove, placing a conductive bonding agent in the groove, and placing an electronic device in the groove to be held by the conductive bonding agent.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nitin Parekh whose telephone number is 571-272-1663. The examiner can normally be reached on 09:00AM-05:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on 571-272-1732. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9318.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

NP

04-11-05



NITIN PAREKH

PRIMARY EXAMINER

TECHNOLOGY CENTER 2800